

# LICENSING FUEL AND FUEL MODELLING CODES FOR WWER REACTORS

(RER/4/019) B2 New

MODEL PROJECT

## CORE FINANCING

YEAR	Experts		Group Activity	Equipment	Fellowships		Scientific Visits		Group Training	Sub-Contracts	Misc. Comp.	TOTAL
	m/d	US \$	US \$	US \$	m/d	US \$	m/d	US \$	US \$	US \$	US \$	US \$
1997	3/5	46,200	50,000	0	0/0	0	0/0	0	0	15,000	0	111,200
1998	1/5	20,925	0	0	12/0	39,600	0/0	0	50,220	0	0	110,745

First Year Approved 1997

**OBJECTIVES:** The regional development objective is to increase the cost-effectiveness while maintaining the safety of nuclear power plant operations. The project's specific objective is to provide Member States operating WWER-type reactors and their regulatory bodies with information and procedures for licensing new fuel and fuel modelling codes

**BACKGROUND:** With the recent changes in Central and Eastern Europe, most utilities, supported by their governments, now have access to an open market and, as a result, nuclear fuel or services can be bought in any part of the world. Many of the countries in this region have established or in the process of setting up national regulatory bodies, whose responsibility it is to ensure that the operators of nuclear power plants do not endanger the safety of the public and the environment. In this context, good performance of fuel is vital for safe operation. This calls for in-depth knowledge of the design basis of the fuel, fuel characteristics, fuel fabrication history and its expected behaviour under various operating conditions in the reactor. Fuel performance modelling and codes are useful tools both for the operator and the regulatory authority and particularly for the latter in taking licensing decisions. A regional TC project on fuel modelling (RER/4/012) scheduled for completion in 1996 has provided the participating Member States (Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovak Republic, Slovenia and Ukraine) with a computer code for assessing fuel performance in steady state and under power ramp conditions, training in fuel modelling to higher burnups and a fuel database to enable them to undertake modelling on their own, thereby acquiring a technological base on which further developments could be contemplated. The proposed new project aims at passing on the knowhow to each of the participating countries on how to use the fuel modelling codes and the licensing procedures so that eventually the national regulatory authority could perform the licensing function independently. The scope of the project is very much in line with the promotional aspects of safety, and aims at strengthening regulatory bodies in dealing with the fuel located in the reactor core. By handling this as a regional project, all those countries operating WWER NPPs could interact and exchange knowledge in this field while putting the Agency inputs of transfer and knowhow to optimum use, thereby reaping maximum benefits. The project is amenable for monitoring progress in terms of indicators such as the number of staff trained on various aspects of the project, and the extent to which the recipient countries are able to use and license the codes.

**PROJECT PLAN:** Questionnaires will be sent out to all participating countries to identify the knowledge gaps and needs to be fulfilled under this project, based on existing technological levels and the country programmes. The results of the analysis will determine the specific needs of the participating countries. The project will be dealt with from the point of view of three categories of recipients: (a) National regulatory authorities responsible for specifying the safety criteria and licensing of fuel and fuel codes before use; (b) Utilities actually using the fuel and interested in getting the license for fuel loading/reloading; (c) Code developers responsible for designing and qualifying codes and for facilitating licensing by the regulatory authority. The following aspects will be covered under the project execution plan: (i) Training course for introducing the relevant IAEA Safety Series documents; (ii) Familiarization with regulatory legal framework and role of the regulatory authority in licensing; (iii) Review of requirements under the Nuclear Safety Convention; (iv) Training courses on quality assurance applicable to fuel performance computer codes, and fuel fabrication; (v) Training courses on fuel safety criteria targeted at utilities as well as at regulatory authorities; (vi) Fellowships as appropriate. The participating Member States are Bulgaria, the Czech Republic, Hungary, Poland, Romania, the Slovak Republic, Slovenia, Turkey and Ukraine.

**NATIONAL COMMITMENT:** The participating Member States will provide staff with an appropriate level of education and experience to receive training and will provide necessary facilities to host the training courses.

**AGENCY INPUT:** The Agency will act as the co-ordinator of the project activities and will provide expert assistance with respect to fuel and fuel modelling in specific areas, including legal framework, safety issues, QA and fuel fabrication and software needed for computer modelling. The Agency will organise training courses and award fellowships on various topics of relevance to this project. A Steering Committee will be set up to work out the details of the project and progress monitoring.

**PROJECT IMPACT:** In the short term, completion of this project will have a major impact on the safety and reliability of WWER-type nuclear power plants and the related fuel cycle activities, in particular fuel fabrication. In the longer term, development of an indigenous capability to deal with problems of nuclear fuel and improving its performance will have a significant economic impact on nuclear power, which could be extended to other areas of nuclear technology. In all this, national regulatory authorities will benefit most in upgrading their capabilities in this vital area.